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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,670	11/17/2003	Chiahua Ho	MXICP017	4806
25920 7590 12/27/2006 MARTINE PENILLA & GENCARELLA, LLP 710 LAKEWAY DRIVE SUITE 200 SUNNYVALE, CA 94085			EXAMINER PHAN, TRONG Q	
			ART UNIT	PAPER NUMBER
			2827	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/27/2006	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/715,670	<b>Applicant(s)</b> HO, CHIAHUA	
	<b>Examiner</b> TRONG PHAN	<b>Art Unit</b> 2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Drawings*

1. The replacement sheets of drawings received on 10/17/06 are acceptable for examination.

### *Specification*

2. The disclosure is objected to because of the following informalities:

Regarding Fig. 4A, it is not understood how the method of programming the unit cell 100', which is coupled to bitline B2 and wordline W2 (see lines 1-3, page 8 of the original specification), to store a logic value 0 is not involved with anything to the directions of the currents placed on the bitline B2 and wordline W2.

Regarding Fig. 4B, it is not understood how the method of programming the unit cell 100', which is coupled to bitline B2 and wordline W2 (see lines 1-3, page 8 of the original specification), to store a logic value 1 is not involved with anything to the directions of the currents placed on the bitline B2 and wordline W2.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 4-12, 15-16 and 18-20 are, insofar as understood, rejected under 35 U.S.C. 103(a) as being unpatentable over Bessho et al., 7,142,474, in view of

Shukh, 6,845,038.

Bessho et al., 7,142,474, discloses in Fig. 2 a magnetic random access memory MRAM device comprising:

**Regarding claims 1-2 and 15-16:**

a plurality of parallel word lines 3;

a plurality of parallel bit lines 4;

magnetic tunnel junction (MTJ) devices 2 (see line 67, column 1 and lines 1-9, column 2);

**Regarding claims 4:**

second and third word lines are adjacent to and either side of the first word line;

**Regarding claims 5-12, and 18-20:**

as shown in Fig. 5, the positive direction of the current flowing in the word line applied to any memory cell unit when a '1' is recorded; the negative (opposite) direction of the current flowing in the word line applied to any memory cell unit when a "0" is recorded; the positive direction of the current flowing in the bit line applied to any memory cell unit when a '1' is recorded; the negative (opposite) direction of the current flowing in the bit line applied to any memory cell unit when a "0" is recorded; therefore, the MRAM device in Fig. 2 can be programmable by driving the current through the respective word lines and bit lines either positive or negative (opposite) direction and/or in any manner such as recited in claims 5-12 and 18-20 as desired;

Bessho et al., 7,142,474, discloses everything except the MTJ device including a free layer and a pinned layer, the free layer being closer to the bitline than the pinned

layer and having a perpendicular magnetic orientation being perpendicular to the wordline and the bitline as recited in claims 1-2 and 15-16.

Shukh, 6,845,038, discloses in Fig. 3 the use of magnetic tunnel junction (MTJ) memory device 32 having a free layer 56 being closer to the bit line 46 than the pinned layer 54 and having a perpendicular magnetic orientation being perpendicular to the word line 44 and the bit line 46 as indicated by the upward arrow (see lines 23-27 and 44-46, column 3).

It would have been obvious under 35 USC 103(a) to one of ordinary skill in the art at the time of the invention was made to utilize the magnetic tunnel junction (MTJ) memory device 32 in Fig. 3 of Shukh, 6,845,038, for the magnetic tunnel junction (MTJ) devices 2 in Fig. 2 of Bessho et al., 7,142,474, for the purpose of having high uniformity of the switching field of the MTJ elements across the MRAM array (see lines 31-32, column 3 of Shukh, 6,845,038).

5. Claims 3 and 17 are, insofar as understood, rejected under 35 U.S.C. 103(a) as being unpatentable over Bessho et al., 7,142,474, in view of Shukh, 6,845,038, as applied to claims 1-2, 4-12, 15-16 and 18-20 above, and further in view of Gallagher et al., 5,640,343.

Bessho et al., 7,142,474, which is modified by Shukh, 6,845,038, disclose everything except the diode disposed below the MTJ device and being electrical communication with the wordline and the pinned layer as recited in claims 3 and 17.

Gallagher et al., 5,640,343, discloses in Figs. 1A and 1B a MRAM device having a silicon junction diode 7 disposed below the MTJ device 8 and being electrical communication with the word lines (1-3) and the fixed pinned layer 20.

It would have been obvious under 35 USC 103(a) to one of ordinary skill in the art at the time of the invention was made to utilize the silicon junction diode 7 in Figs. 1A and 1B of Gallagher et al., 5,640,343, for the magnetic tunnel junction (MTJ) devices 2 in Fig. 2 of Bessho et al., 7,142,474, which is modified by Shukh, 6,845,038, for the purpose of providing a unidirectional current valve (see lines 58-59, column 10 of Gallagher et al., 5,640,343).

6. Claims 13-14 are, insofar as understood, rejected under 35 U.S.C. 103(a) as being unpatentable over Bessho et al., 7,142,474, in view of Shukh, 6,845,038; and Gallagher et al., 5,640,343, as applied to claims 1-12 and 15-20 above, and further in view of Reohr et al., 6,404,671.

Bessho et al., 7,142,474, which is modified by Shukh, 6,845,038, and Gallagher et al., 5,640,343, discloses everything except the features as recited in claims 13-14.

Reohr et al., 6,404,671, discloses in Fig. 4B the teaching of driving the write currents  $I_{N-1}$  and  $I_{N+1}$  flowing through bit lines N-1 and N+1 adjacent to and on either side of the bit line N, respectively, in opposite directions with respect to each other for generating the respective in-plane stray magnetic fields  $H_{N-1}$  and  $H_{N+1}$  canceling each other (see lines 12-26, column 13).

It would have been obvious under 35 USC 103(a) to one of ordinary skill in the art at the time of the invention was made to modified Bessho et al., 7,142,474, which is

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modified by Shukh, 6,845,038, and Gallagher et al., 5,640,343, for the purpose of no requirement of write field compensation (see lines 25-26, column 13 of Reohr et al., 6,404,671).

***Response to Arguments***

7. Applicant's arguments filed on 10/17/06 have been fully considered and are persuasive. Therefore, the last office action of 6/15/06 has been withdrawn.

However, in view of Applicant's amendments and the newly discovered prior arts of Bessho et al., 7,142,474, Shukh, 6,845,038, and Reohr et al., 6,404,671, a new non-final office action has been set forth as above.

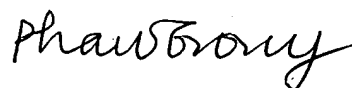
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TRONG PHAN whose telephone number is (571) 272-1794. The examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, AMIR ZARABIAN can be reached on (571)272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'Phan Trong', written in a cursive style.

**TRONG PHAN  
PRIMARY EXAMINER**





Approved  
TP  
12/17/06

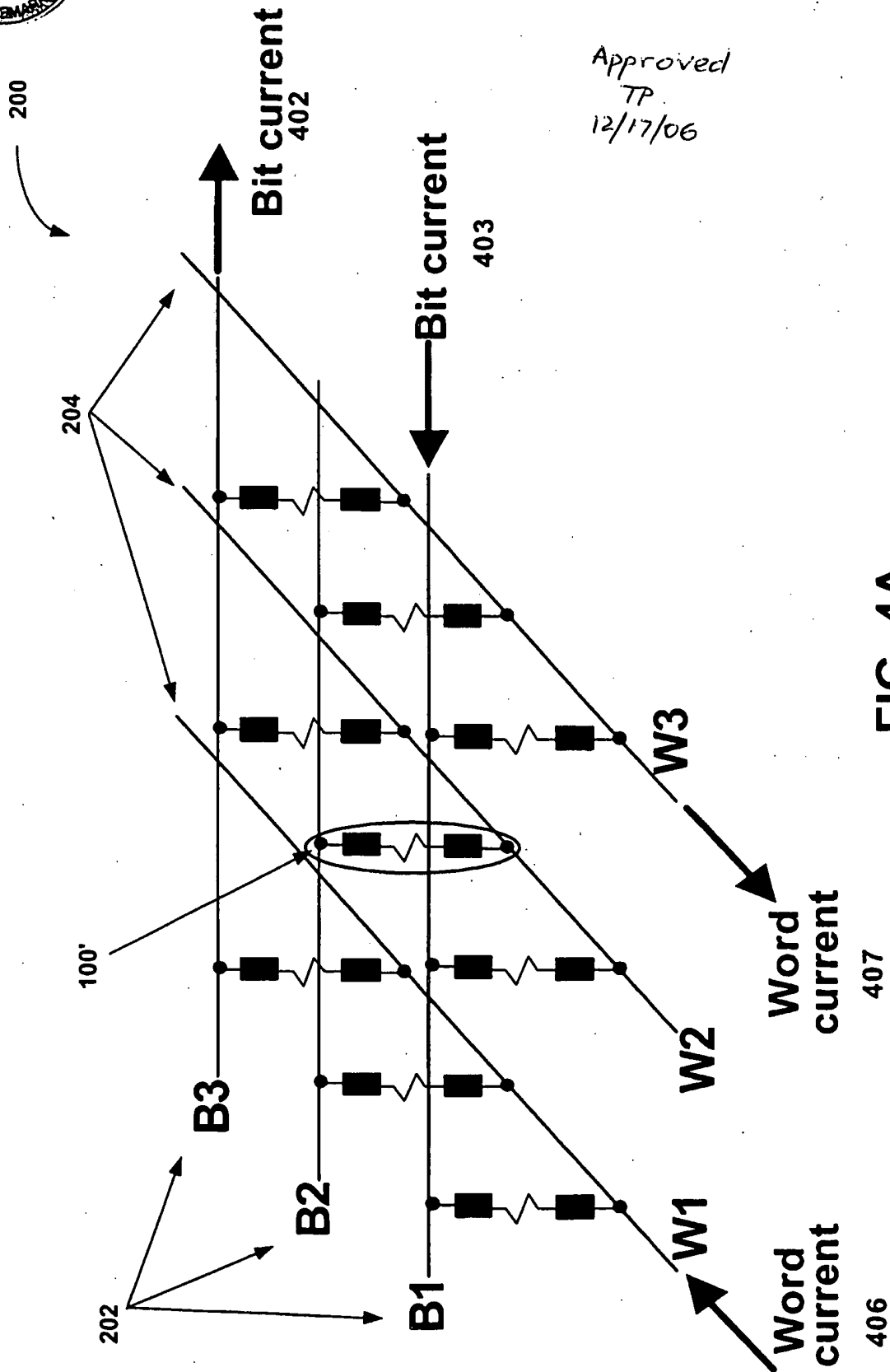


FIG. 4A

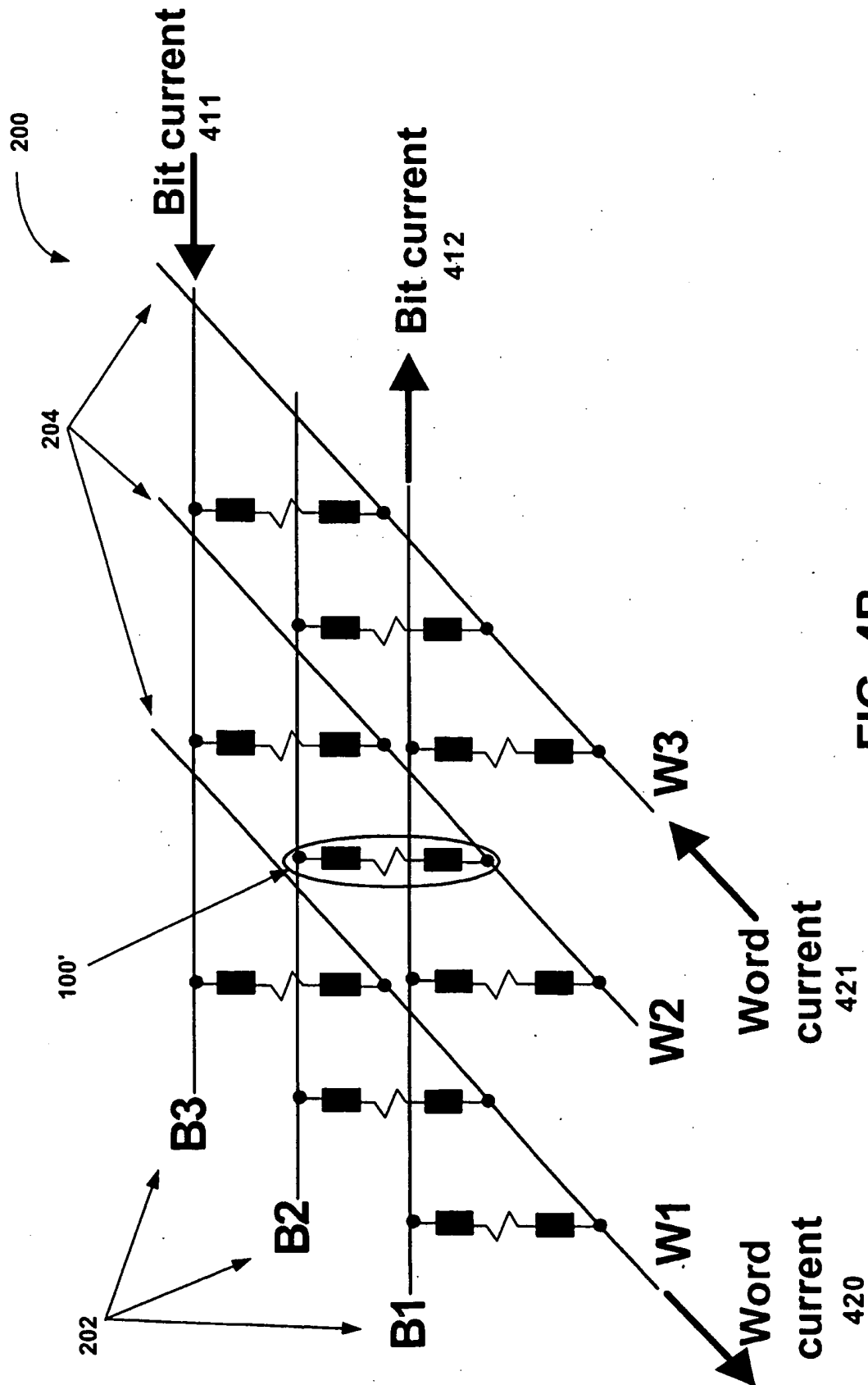


FIG. 4B

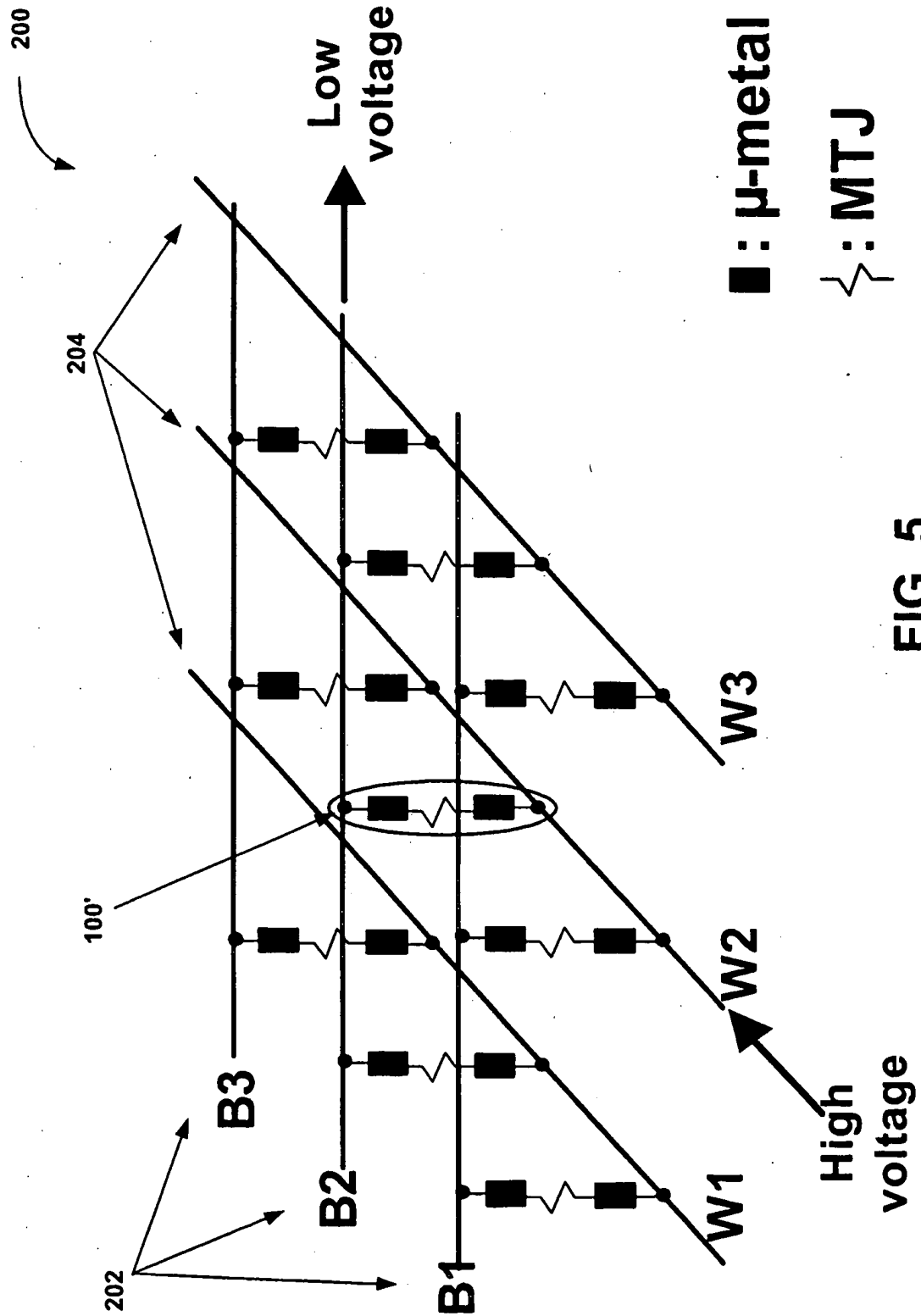


FIG. 5